



St. Joseph Hospital
PeaceHealth

Early Extubation in the Cardiac Surgery Patient

*Our Vision 2012: Every Peacehealth Patient Will
Receive Safe, Evidence Based, Compassionate Care;
Every Time, Every Touch.*





Overview

- Culture of Early Extubation
- Protocols
- Data
- Barriers



Creating a Culture of Early Extubation

- **Early extubation has been the norm since 1994**
- **RN and RT training emphasizes the expectation of early extubation**
- **Continual communication between RN and RT regarding patient extubation readiness**



Culture of Early Extubation continued...

- **1:1 RN to patient ratio until patient is extubated. 1:4 RT to ventilator ratio**
- **One RT managing the post-operative ventilator course**
- **RTs round frequently to ensure weaning begins as soon as patient meets criteria**



Protocols

- **ICU ventilator and sedation/analgesia orders for short term ventilation**
- **Cardiac surgery extubation protocol**
- **Post extubation cardiac surgery protocol**



ICU Ventilator Sedation/Analgesia Orders for Short Term Ventilation

Medications:

- Fentanyl 25-50mcg IV every 10 minutes
PRN pain until extubated
- Midazolam 0.5 –2mgs IV every 30 minutes
PRN for anxiety until extubated
- Other sedation_____



RT Cardiac Surgery Ventilator Weaning and Extubation Protocol

Ventilator Setup and Adjustment:

- **Mode = CMV**
- **Set tidal volume = 8 ml/kg IBW**
- **Adjust RR to approximate V_e used in OR**
 - Pt may initially require slightly higher V_e than in OR
 - Initial EtCO₂ for normal lungs 30 – 40



Extubation Protocol continued...

- **Set PEEP to 8 cmH₂O if not contraindicated**
- **Set FiO₂ same as OR settings and titrate using oxygenation table after initial ABG**
- **Oxygenation Table: Goal SpO₂ > 90%**

FiO₂	.40	.50	.50	.60	.70	.80	.90
PEEP	8	8	10	10	10	10	10



Ventilator Management:

In keeping with a lung protective strategy...

Plateau Pressure Goal < 30 cmH₂O

If Pst \geq 30 cmH₂O :

- **Decrease Vt 1 mL/kg IBW to 6 mL/kg IBW**
- **Change to Pressure Control Mode with maximum pressure of 35 cmH₂O**



Ventilator Management:

ABG Goals:

- pH 7.35 – 7.45
- PaCO₂ 35-45 mmHg or pt's normal if CO₂ retainer
- PaO₂ > 65 mmHg
- HCO₃ 22 – 26 mmEq/mL
- BE 0 ± 2
- SaO₂ > 90%



Ventilator Management:

Call physician if ABG results are:

- **pH < 7.30 or > 7.5**
- **PaCO₂ < 30 or > 55 mmHg and acidotic**
- **PaO₂ < 60 mmHg and not corrected by ventilator**
- **BE < -5**



Ready, set, wean!

Criteria to Initiate Weaning:

- Chest tubes drainage below 100cc/hr
- Blood pressure is within prescribed parameters
- Cardiac index ≥ 2
- Absence of frequent ventricular dysrhythmias
- Pt is spontaneously breathing
- $FiO_2 \leq .50$
- $Ve \leq 12$ lpm



Liberating from ETT

Weaning Procedure:

- Wean PEEP to 5 cmH₂O
- Ventilator mode to CPAP with PS
- Adjust PS to keep Vt \geq 5 mL/kg IBW
- Maximum PS = 20 cmH₂O
- Wean PS to 5 cmH₂O
- Patient must be on PS of 5 cmH₂O for \geq 15minutes



Liberating from ETT

Obtain weaning parameters:

$\text{NIF} > -20 \text{ cmH}_2\text{O}$

$\text{VC} > 10-15 \text{ mL/kg}$

$\text{Ve} \leq 12 \text{ lpm}$

$\text{RR} > 10 \text{ or } < 24 \text{ bpm}$

$\text{Spontaneous } \text{Vt} \geq 5 \text{ mL/kg IBW}$



Liberating from ETT

Neuro Assessment:

- **Move all extremities on command**
- **Nods appropriately to questions**
- **Cough reflex intact**
- **Can lift head and legs off of bed**



“If at first you don’t succeed...”

Failure Criteria:

- **Vt < 5 mL/kg IBW**
- **SpO2 < 90 % with FiO2 ≤ .50**
- **RR > 30 bpm**
- **HR increase of 20 bpm**
- **Arrhythmia**
- **Increased WOB**



Tick Tock Tick Tock...



Criteria Requiring Physician Evaluation:

MD must be consulted if any of following conditions exist:

- **Patient does not meet extubation criteria**
- **RN or RT has reservations about the appropriateness of extubation**
- **Cardiac index <2**



Success!

Approximate hours on ventilator post op; **4**

Average doses of midazolam in ICU; **1**

Calls to MD for extubation order; **0**

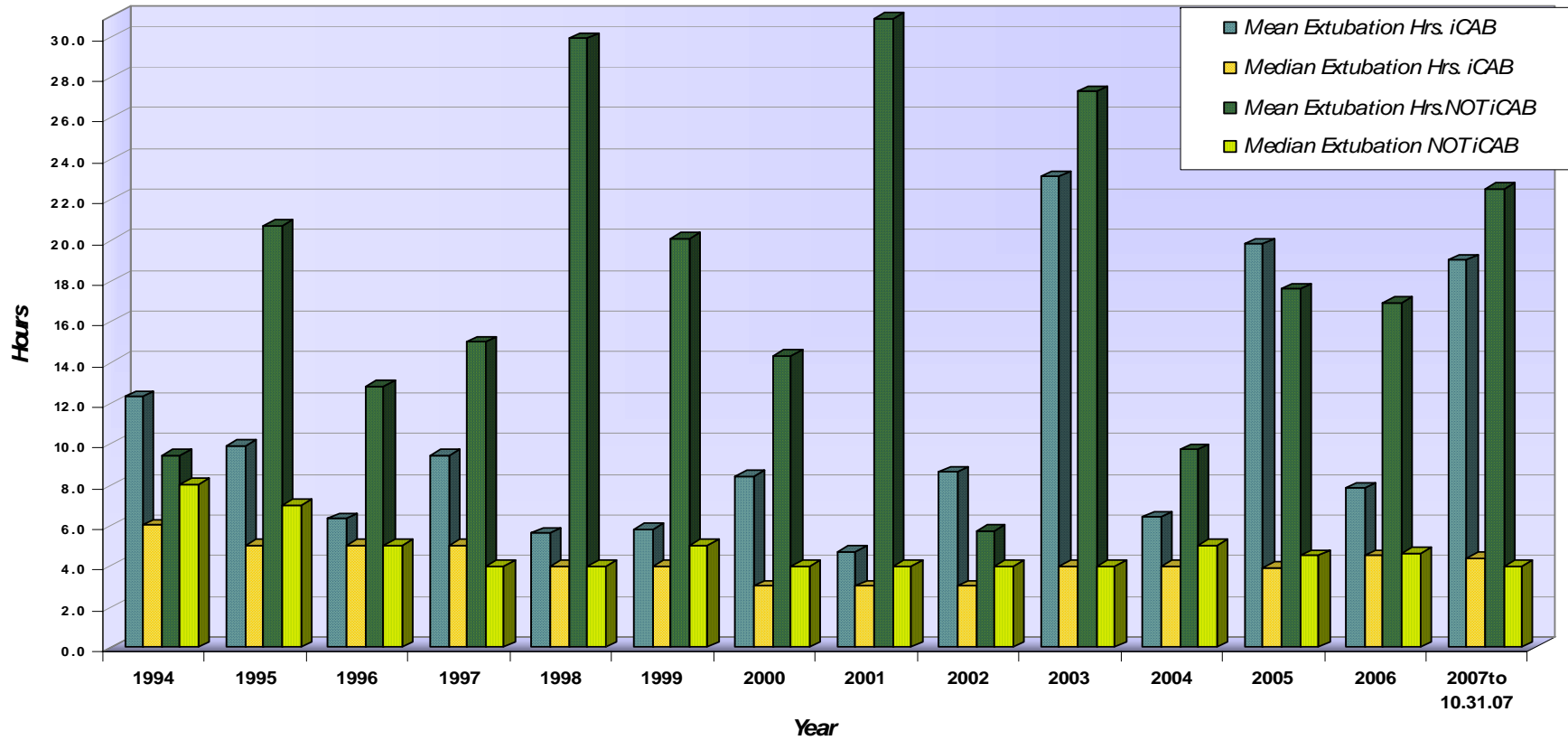
Reintubation rate **< 3%**

**talking to your family instead of
breathing through a tube**

....priceless



SJH Cardiac Surgery Extubation Times



Extubation protocol used since inception of SJH Cardiac Surgery Program has resulted in stable median extubation times over more than ten years.



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Non-patient related barriers

RT unavailable to be at bedside



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